

IN THE CLAIMS

1. (Previously presented) A fiber mat faced gypsum board made by

(1) contacting a gypsum slurry for forming a set gypsum core with

(2) a non-coated side of a pre-coated fiber mat, wherein the fiber mat has a thickness of between 0.02 and 0.045 inch and has a coating on a side opposite the non-coated side, said coating weighing about 30 to 100 pounds per 1000 square feet of mat and comprising a combination of (i) a mineral pigment, (ii) an organic binder and optionally (iii) an inorganic binder, the coating extending from a surface of said side opposite into said fiber mat a distance between about 30 and 50 percent of said thickness and having a microporosity, as measured by a modified Gurley method, of between 2 and 45 seconds, which allows air to flow through as gypsum penetrates the mat and water to evaporate through said pre-coated mat from the gypsum core during preparation of the board,

(3) wherein the contacting causes said gypsum slurry to penetrate into the non-coated side and through interstices of the fiber mat to fill said interstices with gypsum and form a bond between said gypsum and said coating, and

(4) allowing the gypsum slurry to harden to form said set gypsum core, wherein the set gypsum core in a region near the bond has at least 17 percent combined water.

2. (Original) The board of claim 1 wherein the organic binder is a hydrophobic, UV resistant polymer latex.

3. (Original) The board of claim 2 wherein said mat contains glass fibers nominally about 10 to 16 microns in diameter.

4. (Original) The board of claim 3 in which said mat, in the absence of said coating, has a basis weight of 1 to 3 pounds per 100 square feet.

5. (Original) The board of claim 1 having a gypsum core density of 40 to 55 pounds per cubic foot.

6. (Canceled).

7. (Currently amended) The board of claim 1 ~~claim 6~~ wherein, on a dry weight basis, the mineral pigment comprises from about 75 to 99 weight percent of the coating, the inorganic binder comprises from about 0 to 20 weight percent of the coating and the organic binder comprises from about 1 to 17 weight percent of the coating and the microporosity of the coating as measured by the modified Gurley method is between 5 and 20 seconds.

8. (Canceled).

9. (Currently amended) The board of ~~claim 8~~ claim 7 wherein, on a dry weight basis, the mineral pigment comprises from about 83 to 95 weight percent of the coating, the inorganic binder comprises from about 0 to 10 weight percent of the coating and the organic binder is a hydrophobic, UV resistant polymer latex binder and comprises from about 1 to 12 weight percent of the coating.

10. (Original) The board of claim 9 wherein said coating was applied to a surface of the fiber mat as an aqueous coating composition and dried to form said pre-coated mat.

11. (Original) The board of claim 10 wherein said aqueous coating composition includes about 0.1 to about 5 wt. % of one or more additives selected from the group consisting of a thickener, dispersant, colorant, defoaming agent and preservative.

12. (Canceled).

13. (Previously presented) The board of claim 10 wherein the set gypsum core contains a water-resistant additive in an amount of at least about 0.2 wt. %.

14. (Canceled).

15. (Currently amended) The board of ~~claim 14~~ claim 13 wherein said water resistant additive is selected from the group consisting of a wax emulsion, a wax-asphalt emulsion, poly(vinyl alcohol), a polysiloxane, a siliconate and mixtures thereof.

16. (Currently amended) The board of ~~claim 8~~ claim 7 wherein the organic binder is a hydrophobic, UV resistant polymer latex adhesive binder and consists essentially of a (meth)acrylic or (meth)acrylate polymer or a (meth)acrylic or (meth)acrylate copolymer.

17. (Previously presented) The board of claim 16 wherein said pre-coated fiber mat consists essentially of glass fibers and wherein the set gypsum core of the fiber mat faced gypsum board is faced on an opposite side with another fibrous mat which consists essentially of a blend of glass fibers and synthetic fibers.

18-20. (Canceled).

21. (New) A fiber mat faced gypsum board made by:

contacting a gypsum slurry for forming a set gypsum core with a non-coated side of a pre-coated fiber mat,

wherein the fiber mat has a coating on a side opposite the non-coated side,
said coating weighing about 30 to 100 pounds per 1000 square feet of mat and
comprising a combination of

- (i) a mineral pigment,
- (ii) an organic binder and
- optionally, (iii) an inorganic binder,

the coating penetrating from a surface of said side opposite into said fiber mat
to a depth of about 30 percent to about 50 percent of the thickness of the glass fiber
mat, and

having a microporosity, as measured by a modified Gurley method, of
between 2 and 45 seconds, which allows air to flow through as gypsum penetrates the
mat and water to evaporate through said pre-coated mat from the gypsum core during
preparation of the board,

wherein the contacting causes said gypsum slurry to penetrate into the non-coated
side and through interstices of the fiber mat to fill said interstices with gypsum and form a
bond between said gypsum and said coating, and

allowing the gypsum slurry to harden to form said set gypsum core, wherein the set
gypsum core in a region near the bond has at least 17 percent combined water.

22. (New) The fiber mat faced gypsum board of claim 21, wherein the mineral
pigment is limestone and the organic binder is an acrylic copolymer having a three-minute Cobb
value of 1.5 grams or below.

23. (New) The fiber mat faced gypsum board of claim 21, wherein the coating
penetration is within about 30 percent to about 50 percent of the thickness of the glass fiber mat
over at least 50 percent of the surface area across the entire mat.

24. (New) The fiber mat faced gypsum board of claim 21, wherein the coating penetration is within about 35 percent to about 50 percent of the thickness of the glass fiber mat over at least 75 percent of the surface area across the entire mat.

25. (New) The fiber mat faced gypsum board of claim 21, wherein the microporosity of the coating is about 2 to about 45 seconds over at least 50 percent of the surface area across the entire mat, wherein the microporosity as measured by a modified Gurley method.

26. (New) The fiber mat faced gypsum board of claim 21, wherein the microporosity of the coating is about 5 to about 20 seconds over at least 75 percent of the surface area of the entire mat, as measured by a modified Gurley method.

27. (New) The fiber mat faced gypsum board of claim 21, wherein the density of the core of the pre-coated fiber mat is within about 40 to about 55 pounds per cubic foot over at least 50 percent of the surface area of the entire mat.

28. (New) The fiber mat faced gypsum board of claim 21, wherein the pre-coated fiber mat is essentially liquid impermeable.

29. (New) The fiber mat faced gypsum board of claim 21, wherein a bond between the gypsum core and the mat facer of the fiber mat faced gypsum board has a tensile strength of about 16 pounds per square inch.

30. (New) A method of making a fiber mat faced gypsum wall board comprising:
depositing the gypsum slurry for forming a set gypsum core onto a non-coated side of a pre-coated fiber mat, the fiber mat having a coating on a side opposite the non-coated side,
said coating weighing about 30 to 100 pounds per 1000 square feet of mat and comprising a combination of
(i) a mineral pigment,
(ii) an organic binder and optionally
(iii) an inorganic binder, the coating extending from a surface of said side opposite into said fiber mat, and
having a microporosity, as measured by a modified Gurley method, of between 2 and 45 seconds, which allows air to flow through as gypsum penetrates the mat and water to evaporate through said pre-coated mat from the gypsum core during preparation of the board,
the deposited gypsum slurry penetrating into the non-coated side and through interstices of the fiber mat to fill said interstices with gypsum and form a bond between said gypsum and said coating; and
drying the gypsum slurry to form a set gypsum core, the set gypsum core having in a region near the bond has at least 17 percent combined water.

31. (New) The method of claim 30, wherein depositing comprises discharging a first stream of gypsum slurry onto the pre-coated mat to form a first gypsum layer, then discharging a second, lower-density stream of a gypsum slurry onto the first layer.

32. (New) The method of claim 31, wherein the first stream is 18 percent to 20 percent more dense than the second stream.